EFFECTIVE MODELS FOR K-12 VIRTUAL SCHOOLS

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In the following report, Hanover Research examines the benefits and drawbacks of K-12 virtual schools. The report highlights trends in virtual school education as well as the research base regarding online learning and student outcomes. Finally, the report profiles four prominent virtual school vendors that provide comprehensive virtual school curricula that can be tailored by districts.

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INTRODUCTION

Growing demand for virtual learning solutions at the K-12 level has led to a dramatic increase in the availability of online courses and virtual school options. In spite of the vast number of online education providers, widespread uptake of K-12 online learning programs is still a recent phenomenon, with most well-established programs only starting about 10-12 years ago. Evergreen Education Group, which produces the annual *Keeping Pace With K-12 Digital Learning* report, estimates that enrollment in online courses among public school learners doubled between the 2008-2009 and the 2012-2013 school year, to 750,000 total course enrollments.[1] The literature suggests that currently available K-12 online learning programs are diverse in structure and, importantly, quality. As a growing number of school districts and states pursue online learning options for students, it is important to consider the expertise and results of well-established K-12 virtual school programs.

In the following report, Hanover Research examines virtual school implementation, including the research base on student outcomes as well as the most common models districts use in establishing quality online education programs. In addition, the report provides four detailed profiles of effective virtual school vendors that offer customized virtual learning solutions for K-12 districts. The report comprises the following two sections:

- **Section I**: Discusses virtual learning in K-12 education and highlights a number of challenges frequently faced by school districts in their efforts to provide rigorous, high-quality curriculum.

- **Section II**: Profiles four high-quality virtual learning programs that may be adapted to individual district needs.

KEY FINDINGS

- **Virtual schools are rapidly expanding despite the ongoing debate regarding the quality of online education**. Advocates point to the advantages associated with virtual schools, including increased educational choice, more access to otherwise unavailable resources, and flexible, individualized learning pathways. However, sceptics of virtual schools note that most online learning programs do not show positive student learning outcomes as compared to traditional brick-and-mortar schools. Additionally, some educators express concern that most virtual school programs are operated by for-profit education management companies, which could potentially introduce profit motives into important curricular decisions.

- **The research base provides little evidence that enrollment in full-time virtual schools leads to improved student learning compared with traditional brick-and-mortar public schools**. Some small scale reviews on the effect of virtual schools have

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[1] "Student Participation in K-12 Online Education Grows but Fewer States Run Virtual Schools and Classes." The Hechinger Report. http://educationbythenumbers.org/content/k-12-online-education-grows_621/

indicated improved student results as a result of online learning, but many larger studies have noted that full-time virtual schools consistently underperform. For example, a 2013 report from the National Education Policy Center found that full-time virtual schools do not, in aggregate, perform as well as brick-and-mortar schools.

- **There is little evidence-based research documenting best practices for virtual schools**. Most recommendations in both the literature and among educational organizations are from traditional, face-to-face instructional environments. Researchers note that the lack of best practices regarding online learning is problematic, as the virtual school industry is growing, and effective practices in a physical classroom may not transfer to online environments.

- **A transition from face-to-face instruction to an online learning environment requires educators to assume new roles and responsibilities.** The literature indicates that the pedagogy for online courses varies substantially from that of traditional classrooms. To promote quality online instruction that encourages student engagement, it is recommended that schools establish necessary professional development for teachers in parallel with online learning providers.

- **There are a number of advantages and disadvantages to outsourcing virtual learning curricula as opposed to developing online courses in-house**. For example, educational developers offer a wide curriculum variety that may be difficult to generate at the district level. However, the cost of purchasing outside curriculum tools has the potential to greatly exceed the costs of developing it internally.

- **The virtual school programs profiled in this report use collaborative elements to strengthen the quality and rigor of students' online learning experiences**. For example:
  - **K12 Inc**. enables districts to select a portfolio of curricular options, including tailored virtual programs for credit recovery and learning and remediation options.
  - **Odysseyware** offers core subjects, placement testing, diagnostics, and professional development for teachers.
  - **Apex Learning** provides a standards-based, pedagogical digital curriculum, emphasizing interactive content where students observe, inquire, and create.
  - **NROC** is a non-profit virtual learning "movement" comprised of member institutions representing education leaders, teachers, and student to develop and share online resources.

SECTION I: VIRTUAL LEARNING MODELS AND EFFECTIVENESS

This section provides a brief overview of online and virtual learning, as well as the characteristics of online courses available in K-12 education. Additionally, the section identifies a number of virtual school implementation models, noting how districts can select the best program model for their student population.

BACKGROUND

Virtual schools, which are sometimes referred to as online or cyber schools, are a small but growing share of the K-12 education landscape. Researchers have defined virtual schools as those that "deliver all curriculum and instruction via the internet and electronic communication, usually with students at home and teachers at a remote location, and usually with everyone participating at different times."[2] This definition excludes blended or hybrid content delivery methods that combine face-to-face and virtual learning. There are a number of types of virtual schools that serve K-12 students in the U.S. The Center for Public Education has identified the program types highlighted in Figure 1.1.

Figure 1.1: Categories of K-12 Virtual School Programs

CATEGORY	ORGANIZATION TYPE/ GOVERNANCE	FULL-TIME OR SUPPLEMENTAL	FUNDING SOURCE	GEOGRAPHIC REACH
State-wide virtual school	State education agency	Supplemental	State appropriation, course fees, funding formula	Statewide
Multi-District	Charter or district-run	Full-time	Public education funding formula	Statewide
Single-District	District	Either or both	District funds	Single-district
Consortium	Variable	Supplemental	Course fees, consortium member fees	Statewide, national or global

Source: Center for Public Education[3]

The 2014 *Keeping Pace with K-12 Digital Learning* report, which is published annually by Evergreen Education Group with sponsorship from a number of for-profit and non-profit virtual school providers, indicated that single district virtual learning programs are the fastest growing segment of online learning.[4] Single-district programs primarily focus on specific

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[2] Miron, G., B. Horvitz, and C. Gulosino. "Virtual Schools in the U.S. 2013: Politics, Performance, Policy, and Research Evidence." National Education Policy Center, May 2013. p. 1. http://nepc.colorado.edu/files/nepc-virtual-2013-section-1-2.pdf

[3] Barth, R., J. Hull, and R. St. Andrie. "Searching for the Reality of Virtual Schools." The Center for Public Education, May 2012. p. 5. http://www.centerforpubliceducation.org/Main-Menu/Organizing-a-school/Searching-for-the-reality-of-virtual-schools-at-a-glance/Searching-for-the-reality-of-virtual-schools-full-report.pdf

[4] Watson, J. et. al. "Keeping Pace With K-12 Digital Learning: An Annual Review of Policy and Practice." Evergreen Education Group, 2014. p. 4. http://www.inacol.org/wp-content/uploads/2015/03/EEG_KP2014-fnl-lr1.pdf

student groups, such as at-risk students and students in need of credit recovery. Additionally, district-level programs often combine traditional face-to-face and virtual learning, though an increasing number provide full-time virtual programming. Most virtual learning programs operate at the high school and middle school levels, with smaller districts beginning to design online programming options for elementary school students.[5] Researchers at the National Education Policy Center (NEPC), a non-profit organization dedicated to providing peer-reviewed education research, also notes that of all of the virtual school models, full-time virtual schools are currently receiving the most attention among educators.[6] In recent years, more than 30 states have allowed full-time virtual schools to operate, while some states require one or more courses to be delivered to public school students online.[7]

There are a various estimates for the total enrollment in full-time virtual schools, but most sources indicate the number of virtual school programs and student enrollments is growing. For example, the International Association for K-12 Online Learning (iNACOL) indicates there were upwards of 250,000 students enrolled full-time in virtual schools in 2011-2012, while an NEPC report suggests that full-time virtual school enrollment is below 200,000.[8] A far higher number of students are estimated to be enrolled in some kind of virtual learning, primarily in supplemental online courses. The 2015 *Keeping Pace with K-12 Digital Learning* report extrapolates data from for-profit online course providers, state-level data, and school districts, and estimates that more than 2.2 million students are enrolled in about 3.8 million online courses. These estimates, notably, are in addition to virtual school numbers.[9]

REASONS FOR TAKING VIRTUAL COURSES

Students participate in virtual courses for a variety of reasons based on their location, their educational goals, and the programs offered by their traditional school. The Southern Regional Education Board (SREB) gathered information from students in 13 state virtual schools regarding their reasons for enrolling in these courses in 2006-2007 and 2009-2010, and found some slight changes in student motivation over time. Figure 1.2 highlights the reasons cited, which most commonly included the need for supplemental instruction, course unavailability at traditional schools, and the need to graduate on time (met by taking online courses.) Notably, none of the SREB respondents indicated that students were taking online courses as part of a full-time course of study to replace enrollment at a traditional school.[10]

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[5] Watson, J. et. al. "Keeping Pace With K-12 Digital Learning: An Annual Review of Policy and Practice." Evergreen Education Group, 2015. p. 30. http://www.kpk12.com/wp-content/uploads/Evergreen_KeepingPace_2015.pdf
[6] Miron, G., B. Horvitz, and C. Gulosino, Op. cit., p. 4.
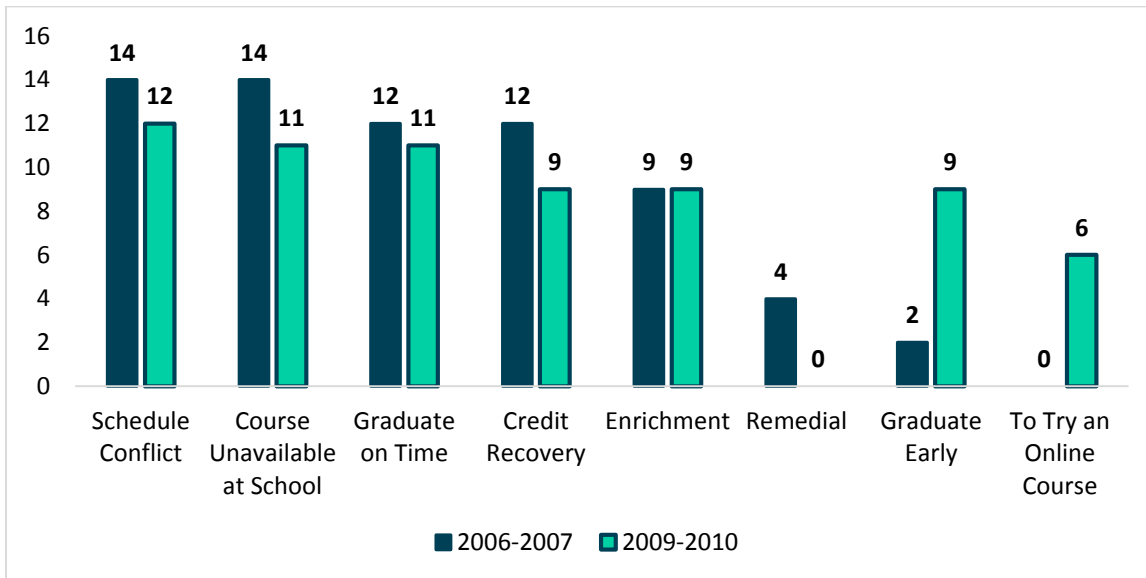[7] Ibid.
[8] Ibid., p. 5.
[9] Watson, J. et. al., 2015. Op. cit., p. 16.
[10] "Trends in State-Run Virtual Schools in the SREB Region." February 2013, February 2013. p. 8. http://publications.sreb.org/2013/13T01_Trends_State-Run.pdf

Figure 1.2: Number of SREB State-Run Virtual Schools Reporting Reasons for Student Online Course Enrollment

Source: SREB[11]
Note: the 2006-2007 survey did not offer a response option for "To Try an Online Course"

NEBRASKA VIRTUAL LEARNING CONTEXT

According to the International Association for K-12 Online Learning (iNACOL), Nebraska has a "fair" level of availability for resources on digital learning. As of 2013-2014, there were no fully online public school options.[12] However, the Nebraska BlendED Initiative, which is one of several blended learning initiatives, offers courses to Grade 3-12 students, serving over 7,400 course enrollments.[13] For virtual learning opportunities, the state offers a "combination of blending learning, video conferencing, and supplemental online courses to its students; it does not have a fully online public school option."[14] Additionally, Nebraska has a growing number of virtual learning initiatives and partnerships, such as:[15]

- **Nebraska Virtual Instruction Source (NVIS)**: Offers over 347 courses in various delivery modes to 237 of 256 Nebraska districts; it reported 7,479 enrollments in the BlendED initiative in the 2013-20014 school year. The NVIS was created by the Nebraska Virtual Partnership, along with the K-12 and higher education systems, the Education Service Unit Coordinating Council, the Department of Education, and Nebraska Education Television. Schools are paid up to $1,000 per course enrollment per semester for courses exchanged via Network Nebraska, and must complete an annual report to NVIS to claim incentive dollars, which come from state lottery funds.

- **University of Nebraska High School (UNHS)**: Offers 100 asynchronous online courses to students nationally and internationally. UNHS reported 2,679 unique students,

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[11] Chart contents taken verbatim from: Ibid.

[12] Watson, J. et. al., 2014. Op. cit., p. 126.

[13] Ibid.

[14] Ibid.

[15] Bullet points taken nearly verbatim from: Ibid.

including 239 Nebraska students, enrolled in the 2013-2014 school year. Nebraska schools pay $194 per semester course. The UNHS distance courses must be made available to all students at the school's expense.

- **Nebraska Virtual Academy (NEVA)**: A consortium of schools offering blended courses through Moodle and video conferencing. Omaha Public Schools eLearning, which initially was designed to meet the needs of credit recovery students in Grades 9-12, has evolved into a blended learning program for all students.

Many educators believe that Nebraska is an ideal location for the increased presence of virtual schools. The Platte Institute, a center-right "free market think tank" located in Omaha, commissioned a report in 2011 promoting the expansion of virtual schools in the state. The report argues that the Nebraska is well suited to implement virtual schools – not only at the state but also at the district level – for a number of reasons, including the rural nature of most Nebraska school districts and the overall need for the state to enhance its use of technology in education.[16]

OUTCOMES OF VIRTUAL SCHOOLS

BENEFITS OF ONLINE EDUCATION

Proponents of virtual schools point to a number of benefits, including expanding students' exposure to curriculum options and personalizing student learning experiences.[17] Districts that choose to implement virtual learning options commonly cite the potential educational benefits, including opportunities for credit recovery and the ability to offer courses not otherwise available in the district.[18] For example, virtual schools have the potential to "extend equitable access to high quality education to students from high-need urban and rural schools, low achieving students, and students with special needs."[19]

As more stakeholders become aware of the benefits of high quality online K-12 curriculum and the growing number of tools and options, interest in virtual education has quickly grown at the school, district, and state levels. The U.S. Department of Education identified a number of specific benefits associated with online learning for K-12 students, including individualized learning paths and the potential to increase overall student learning. The full list is highlighted in Figure 1.3.

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[16] Alger, V. "Policy Study: Virtual Schools: The Vital Need for Virtual Schools in Nebraska." Platte Institute, 2011. pp. 5–6. https://www.platteinstitute.org/Library/docLib/20110623_my_Virtual_Schools_policy_report2.pdf

[17] Clark, T. "Online Learning: Pure Potential." *Educational Leadership*, 65:8, May 2008. http://www.ascd.org/publications/educational-leadership/may08/vol65/num08/Online-Learning@-Pure-Potential.aspx

[18] "Fast Facts About Online Learning." International Association for K-12 Online Learning, October 2013. p. 1. http://www.inacol.org/wp-content/uploads/2015/02/fun-facts-about-online-learning.pdf

[19] Clark, T. and Z. Berge. "Virtual Schools and eLearning: Planning for Success." The Annual Conference on Distance Teaching and Learning, University of Wisconsin System, 2005. p. 2. http://www.uwex.edu/disted/conference/Resource_library/proceedings/03_71.pdf

Figure 1.3: Positive Applications of Virtual Schools and Online Learning

- **Broadening access** in ways that dramatically reduce the cost of providing access to quality educational resources and experiences, particularly for students in remote locations or other situations where challenges such as low student enrollments make the traditional school model impractical;
- **Engaging students** in active learning with instructional materials and access to a wealth of resources that can facilitate the adoption of research-based principles and best practices from the learning sciences, an application that might improve student outcomes without substantially increasing costs;
- **Individualizing and differentiating instruction** based on student performance on diagnostic assessments and preferred pace of learning, thereby improving the efficiency with which students move through a learning progression;
- **Personalizing learning** by building on student interests, which can result in increased student motivation, time on task, and ultimately better learning outcomes;
- **Making better use of teacher and student time** by automating routine tasks and enabling teacher time to focus on high-value activities;
- **Increasing the rate of student learning** by increasing motivation and helping students grasp concepts and demonstrate competency more efficiently;
- **Reducing school-based facilities costs** by leveraging home and community spaces in addition to traditional school buildings;
- **Reducing salary costs** by transferring some educational activities to computers, by increasing teacher-student ratios or by otherwise redesigning processes that allow for more effective use of teacher time; and
- **Realizing opportunities for economies of scale** through reuse of materials and their large-scale distribution.

Source: U.S. Department of Education Office of Educational Technology[20]

Evidence from other studies similarly suggests that virtual learning programs may provide students and schools with a variety of benefits. For example, a 2012 report from iNACOL found that virtual learning models have expanded access to education, reaching students who may otherwise not have had opportunities to take Advanced Placement courses or obtain other academic materials to prepare them for college and their careers.[21]

Though the majority of virtual learning opportunities are designed for middle school and high school students, some studies have indicated positive academic outcomes for elementary students enrolled in virtual schools. For example, a study by the University of Arkansas found that students in Grades 3-6 in the Arkansas Virtual Academy School "improved significantly over their traditional peers: an average 9.6 percentile points in math more and 3.6 points in

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[20] Figure contents taken verbatim from: Bakia, M. et al. "Understanding the Implications of Online Learning for Educational Productivity." Office of Educational Technology, U.S. Department of Education, 2012. p. vii. http://eric.ed.gov/?id=ED532492

[21] Patrick, S., et al. "Measuring Quality from Inputs to Outcomes: Creating Student Learning Performance Metrics and Quality Assurance for Online Schools." International Association for K-12 Online Learning. p. 2. http://www.inacol.org/wp-content/uploads/2015/02/iNACOL_Quality_Metrics.pdf

literacy over a two-year period."[22] Further, a third-party assessment of Rocketship Education, a network of free charter schools in San Jose, California, revealed "sizable math gains among participating students at Kindergarten and Grade 1 compared to their peers."[23]

CHALLENGES TO QUALITY ONLINE EDUCATION

As noted in the previous sub-section, several elements of virtual learning can provide a variety of benefits for students and districts. However, there are also valid concerns regarding the overall quality of fully online education at the K-12 level. The Center for Public Education, an independent organization providing analysis on current topics in public education, suggested in 2012 that one of the defining features of the research regarding virtual schools and online learning in general is "how little is known about its effect on student outcomes, especially at the K-12 level."[24] Research continues to be hampered by a number of obstacles, such as "missing and incomplete data, lax monitoring rules, and a vague picture of students dropping in and out of the online environment and subsequently the accountability system."[25]

Though there are studies pointing to increased academic gains in virtual learning programs, there is a large gap in the quality of many of these studies. The majority of the research base on virtual education and student outcomes, for example, notes a large spectrum in the quality of online learning providers.[26] For example, a report cited by NPR found that two-thirds of full-time online schools are rated as academically unacceptable, with graduation rates substantially below the average of all public schools.[27]

Similarly, the NEPC found that full-time virtual schools do not, in aggregate, perform as well as brick-and-mortar schools. The NEPC's 2013 report on virtual schools examined commonly-used indicators of school performance, including Adequate Yearly Progress (AYP) status, state ratings, and on-time graduation rates, to assess the performance of virtual schools in comparison to brick-and-mortar district and charter schools.[28] The results revealed that in the 2010-2011 school year, 23.6 percent of full-time virtual schools met AYP requirements, compared with 52 percent of brick-and-mortar traditional public schools and 51.1 percent of brick-and-mortar charter schools. Moreover, the report noted that despite higher percentages of virtual schools meeting AYP requirements in 2009-10 (29.6 percent) and 2011-2012 (29.7 percent), "the gap in AYP between virtual and traditional schools has recently hovered around 22 percentage points, offering no evidence of an improvement trend."[29]

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[22] Barth, R., J. Hull, and R. St. Andrie, Op. cit., p. 10.

[23] [1] Ibid.
  [2] Markus, D. "Research Findings: Rocketship Education Boosts Scores with Online Learning." Edutopia, 2011.
      https://www.edutopia.org/blog/stw-online-blended-learning-rocketship

[24] Barth, R., J. Hull, and R. St. Andrie, Op. cit., p. 9.

[25] Ibid.

[26] See for example: Chingos, M.M., and G. Schwerdt. "Virtual Schooling and Student Learning: Evidence from the Florida Virtual School." Harvard Kennedy School, 2014.
      https://www.hks.harvard.edu/pepg/PDF/FLVS%20PEPG%20working%20paper%20(3).pdf

[27] Kamentz, A. "Virtual Schools Bring Real Concerns About Quality." NPRed, February 2, 2015.
      http://www.npr.org/sections/ed/2015/02/02/382167062/virtual-schools-bring-real-concerns-about-quality

[28] Miron, G., B. Horvitz, and C. Gulosino, Op. cit., p. 10.

[29] Ibid.

Figure 1.4 compares overall virtual school performance with traditional brick-and-mortar charter schools and traditional public schools, based on the findings from the NEPC.

Figure 1.2: NEPC Indicators of Virtual School Performance

PERCENTAGE OF SCHOOLS THAT MET AYP (2010-2011)		
Virtual Schools	**Brick-and-Mortar Charter Schools Operated by EMOs**	**Brick-and-Mortar District Schools**
23.6%	51.1%	52.0%

VIRTUAL SCHOOL STATE SCHOOL PERFORMANCE RATINGS (2011-2012)	
Academically Acceptable	**Academically Unacceptable**
28.1%	71.9%

ON-TIME GRADUATION RATES (2011-2012)	
Virtual Schools	**U.S. Average**
37.6%	79.4%

Source National Education Policy Center[30]

The NEPC report highlights the fact that AYP, as an indicator, is an imperfect measure of school performance and that AYP differences between virtual schools and brick-and-mortar schools should be interpreted cautiously. However, despite the fact that AYP is an imperfect indicator, it is a relevant in that its "measures are used to hold all public schools accountable, and they are used to determine whether corrective or punitive action needs to be taken for schools that do not meet their state standards."[31]

An additional challenge faced in virtual learning relates to the differences that exist in social dynamics between teachers and students in an online setting. As noted in a report by the Educational Testing Service on challenges to ensure quality virtual school curricula, electronic message boards are frequently a focal point of instruction, though teachers and students may not have the skills necessary to effectively facilitate meaningful discussion. For example, a professor and faculty chair from the University of Phoenix warns that online students may receive a "less academically rigorous education because they are not challenged to be independent thinkers." If the communication and social interaction aspects of an online course are inadequate, instructors can appear ineffective and students may question the quality of their ideas.[32]

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[30] Chart contents taken from: Ibid., pp. 11–12.

[31] Ibid., p. 11.

[32] Natale, C.F. "Teaching in the World of Virtual K-12 Learning: Challenges to Ensure Educator Quality." Educational Testing Service, 2011. pp. 21–22.
https://www.ets.org/s/educator_licensure/ets_online_teaching_policy_final_report.pdf

VIRTUAL SCHOOL IMPLEMENATION MODELS

Online education courses can vary substantially depending on the type of courses offered, the grade levels served, and the nature of the students who are enrolled. Online learning programs can be full-time or supplemental, and may be synchronous or asynchronous. The majority of online programs are asynchronous, meaning that students and teachers do not necessarily have to be online at the same time. In the following section, Hanover examines strategies for planning and implementing a virtual school, including selecting an external provider or developing curricula internally.

PLANNING PROCESS

Studies on virtual learning suggest that careful planning is required for an online program to be successful.[33] For example, SRI International profiled the implementation of the Virtual Learning Lab program at Miami-Dade County Public Schools, the fourth largest district in the U.S., which was developed in partnership with the Florida Virtual School. When describing how the district established its virtual learning program, administrators from Miami-Dade noted that communication with all stakeholders at the outset was highly important. When planning a virtual program, district leaders should provide sufficient time and information for students and parents to make decisions about enrollment.[34] Prior to implementation, a district should additionally set clear goals and ensure that the goals are student-centered.[35] Administrators from Miami-Dade recommended that educators undertake the steps noted in Figure 1.5 when implementing a virtual learning program.

Figure 1.3: Steps for Selecting a Virtual Learning Program Model

STEP	DESCRIPTION
Select Online Providers	Selecting the right online provider(s) is crucial to the success for the program. Administrators should conduct a thorough analysis of available options, seeking outcome data from providers that address the student population and course content.
Establish a Clear Sense of Roles and Responsibility	Districts need well-established lines of communication and clearly defined lines of authority between themselves and the vendor to identify and solve problems.
Educate Students and Parents About Online Learning Labs	Getting students and their families on board is key to creating a successful program. In Miami-Dade, FLVS administrators noted that student-buy in was crucial to their academic success, with student choice in taking a course playing a large role.

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[33] Watson, J. et. al., "Keeping Pace With K-12 Digital Learning: An Annual Review of Policy and Practice," Evergreen Education Group. 2012, p. 44. www.kpk12.com/wp-content/uploads/KeepingPace2012.pdf

[34] "Implementing Online Learning Labs in Schools and Districts: Lessons from Miami-Dade's First Year." SRI International, November 2011. p. 3.
https://www.sri.com/sites/default/files/brochures/implementing_online_learning_labs.pdf

[35] Watson, J. et. al., 2012. Op. cit., pp. 48–49.

STEP	DESCRIPTION
Demonstrate District Support at the School Level: Soliciting School and Staff Buy-in	Districts should demonstrate their commitment to the virtual school program by providing schools with resources to promote student success. Introducing school staff to the program is another vital step of implementation. By providing education and information to the different roles of school staff, as well as the provider, districts and schools can create clear lines of responsibility.
Adjust Bell Schedule as Needed	Miami-Dade instructed schools to schedule virtual learning courses in additional periods in order to maintain state funding for full-time equivalent students. Twenty participating schools had block schedules that accommodated putting an extra class period in place before VLL implementation. The remaining 18 changed their bell schedule to accommodate an extra course period.

Source: SRI International[36]

IN-HOUSE VS. CONTRACTED CURRICULUM MODELS

Virtual learning curricula may be developed within a school district, licensed from an outside source, or be a combination of both. A survey conducted by Evergreen Education Group, the publisher of the annual *Keeping Pace with K-12 Digital Learning* reports, indicated that the decision to develop internal online courses or purchase them is highly variable: about one-quarter of schools license all of their courses, while a similar percentage develop their own courses. The remaining school districts licensed some, but not all, of their virtual program course curriculum.[37]

iNACOL indicates a number of reasons districts may choose to select virtual learning curriculum from a licensed outside source, namely:[38]

- The expertise of vendor development teams, including writers, instructional designers, multimedia developers, and technologies, often exceeds the expertise within the online program;

- A wide variety of curriculum and specialty courses is difficult to produce in-house;

- A program may lack staffing, funding, and/or expertise to develop and update high production-value content; and

- Organizations that are focused on curriculum development often have the resources to incorporate more extensive user testing and feedback than individual schools. They may also be more equipped to provide regular updates, including maintenance of multimedia-based content over generations of versions and changing technology.

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[36] Chart contents taken nearly verbatim from: "Implementing Online Learning Labs in Schools and Districts: Lessons from Miami-Dade's First Year," Op. cit., pp. 28–32.

[37] Watson, J. and B. Gemin. "Management and Operations of Online Programs." iNACOL, 2009. p. 7. http://www.inacol.org/wp-content/uploads/2015/02/iNACOL_promising-practices-in-online-learning-management-and-operations.pdf

[38] Bullet points taken verbatim from: Ibid.

However, iNACOL also notes several reasons why districts may choose to develop their virtual learning content in-house, including:[39]

- The need to adhere to state and district standards and greater confidence that home-grown courses will do so;

- Linking content creation to teaching online in a way that involves teachers at a greater level than licensed content may allow;

- The expense of licensed curriculum, especially compared to using teachers or other staff who are full-time; and

- Support for specific instructional philosophies not supported by course vendors, such as project- or inquiry-based learning.

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[39] Bullet points taken verbatim from: Ibid.

SECTION II: VENDOR PROFILES

The following section profiles four high-quality virtual learning programs that districts may use "out of the box" or customize to individual district needs. The section begins with an examination of the key issues of selecting a virtual school provider, including the technical and cost implications, before reviewing the four profiles.

SELECTING A PROVIDER

A key component of virtual school programs is the use of an external education provider. Companies or organizations develop curricula, employ instructors, manage course delivery, and provide the technology infrastructure to educate students through the online platform. Larger providers are frequently referred to as educational management organizations (EMOs).

Selecting a provider is often one of the most challenging aspects of launching a virtual school program. The industry is rapidly evolving, and each service offers a number of distinct advantages and disadvantages. Additionally, providers vary considerably to the degree of flexibility they offer educators in choosing a technology platforms and the ability to edit and manipulate content. Large-scale for-profit providers, such as K12 Inc., Odessyware, and Apex Learning provide both complete virtual education curricula as well as individual online courses. Researchers recommend that district administrators consider a number of key questions when selecting a virtual learning program. These considerations are highlighted in Figure 2.1.

Figure 2.1: Key Issues and Questions for Selecting Providers

ISSUES	QUESTIONS TO ASK
Understand the differences between providers who focus on blended or online learning, and those that are more closely aligned to classroom-based educational technology.	▪ How does your product/service address a situation where at least some instruction is done at a distance? ▪ How does your product/service allow for individualized instruction for all students?
Start by determining your virtual learning program plan and then issue an RFP based on key parameters of the program.	▪ Can our teachers modify your content to meet our instructional approaches? ▪ Can you supply teachers for courses where we don't have qualified teachers available?
Determine if you will use your own technology platform that allows for content creation and editing, or if you are seeking content tied to a technology platform.	▪ Is your online content editable? ▪ Can your content be put into a variety of technology platforms?

ISSUES	QUESTIONS TO ASK
Require an online demonstration (not just in slides). Allocate at least 90 minutes for each provider's demonstration, and drive the presentation to cover what you want to see, which may or may not be what the provider wants to show. Include a variety of staff that will be involved in decision-making and/or daily operation of the online learning program.	
Have your review team spend time in the courses and compare notes about what you like and what doesn't work as well, keeping in mind the attributes of the students most likely to be taking the courses.	▪ Can we access your courses as a teacher, and as a student?

Source: Evergreen Education Group[40]

In addition to the considerations highlighted above, school administrators should also consider the cost implications of launching a virtual learning program. Instructional providers represent a significant cost for the online curriculum; however, there are also costs related to hardware, technology infrastructure, facilitator staffing, ongoing professional development, and IT staffing.[41]

In the subsections below, Hanover Research profiles four virtual school providers: K12 Inc., Odysseyware, Apex Learning, and NROC. K12 Inc. and Odysseyware were selected for inclusion in the report at the request of the partner. Apex Learning was selected both because it is a similarly large, comprehensive turnkey virtual school solution and because the vendor has generally high ratings on EdSurge, an independent platform to "help schools find, select, and use the right technology to support all learners."[42] Finally, Hanover Research profiles the NROC Project, a large-scale non-profit movement that provides high-quality virtual learning education free of charge. Like the other three for-profit vendors, NROC has the option for districts to combine pre-authored content with content designed and implemented by teachers.

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[40] Watson, J. et. al. "Keeping Pace with K-12 Online & Blended Learning: An Annual Review of Policy and Practice." Evergreen Education Group, 2013. pp. 46–47. http://www.kpk12.com/wp-content/uploads/EEG_KP2013-lr.pdf

[41] "Implementing Online Learning Labs in Schools and Districts: Lessons from Miami-Dade's First Year," Op. cit., p. 3.

[42] "EdSurge Teacher Feedback." EdSurge. https://www.edsurge.com/reviews/faq

K12 INC.

K12 Inc. is a publicly traded EMO that operates in more than 30 states nationwide with an enrollment of about 125,000 students. [43] It provides tuition-free online public school programs (where program costs are taken on by school districts) as well as full-time online private schools. The company offers a Grade K-8 and a high school program, both of which are intended to provide individualized learning experiences. The company's tuition-free online public schools offer students a range of virtual curricular options, including:[44]

- Online curriculum and hands-on materials;

- Instruction from state-certified teachers;

- Access to course offerings that include core subjects in multiple levels, world languages, and a range of electives;

- An individualized learning plan tailored to each student's strengths and needs; and

- Access to an online community and support tools.

Regardless of their program, students are assigned a Learning Coach, generally a student's parent or guardian, who ensures that the student stays on pace in his or her school work.[45] Learning coaches play a particularly key role in elementary school grades. The suggested time commitment involved for a Learning Coach is:[46]

- **Grades K-5**: 3 to 6 hours

- **Grades 6-8**: 2 to 4 hours

- **Grades 9-12**: 1 to hours

Learning Coaches may participate in a number of K12 Inc.-sponsored support activities, such as lesson guides, videos, and opportunities to speak with other parents and Coaches. Additionally, Learning Coaches may elect to enroll in Learning Coach University (LCU), which offers ad hoc workshops and events on topics such as:[47]

- Using K12's curriculum effectively;

- Math and writing skills refresher series;

- Avoiding burnout;

- Preparing for state testing.

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[43] Cavanagh, S. "K12 Inc. Building a New Identity for Part of the Company." EdWeek, April 1, 2014. http://www.edweek.org/ew/articles/2014/04/02/27rebrand_ep.h33.html?r=312199386

[44] Bullet points taken with minor edits from: "Virtual Schools & Academies." K12 Inc. http://www.k12.com/k12-schools.html

[45] "Tuition-Free Online & Virtual Public Schools." K12 Inc. http://www.k12.com/k12-schools/free-online-public-schools.html

[46] Bullet points taken verbatim from: "The Role of a Learning Coach." K12 Inc. http://www.k12.com/k12-education/learning-coach.html

[47] "Parent Education Activities and Support." K12 Inc. http://www.k12.com/k12-schools/parent-activities-support.html

Tuition-free virtual schools operate on a traditional school calendar. Students typically spend five or six hours per day on coursework and homework, but do not complete all work on the computer. Offline worksheets and projects are also a part of the curriculum.[48]

DISTRICT-RUN MODELS

K12 Inc. operates five school models for its free virtual schools. The model of school is dependent on the state in which students reside. K12 Inc. works with school districts to build a full-time online school program or "Fuel Education" curriculum.[49] "Fuel Education" is a legal entity owned by K12 Inc. that "combines curriculum, technology, instruction, and support to the meet [a district's] specific needs."[50] Using this platform, districts can personalize and manage virtual learning programs. Fuel Education offers a portfolio of curricular options, including Grade K-12 full-time virtual programs, blended and online courses for middle school and high school, credit recovery for high school, and prescriptive learning and remediation for Grades K-12.[51]

The Fuel Education program operates on a personalized open learning platform called PEAK, which provides three major customizable options:[52]

- **Interactive Dashboards**: access to each student's tailored program, teacher and learner tools, and student progress and performance;

- **Student Learning Environment**: students can access resources and specific learning tools, such as videos, text reader, dictionary support, and Spanish-English translation support. Students may also "talk" to their teachers virtually; and

- **Personalized Student Content**: teachers can gather and create resources, including differentiated material from more than 5,600 standard-aligned lessons.

Teachers may log in and quickly access the list of students in their virtual program, including which students need additional support. Further, teachers may design their own lessons, including presentations, images, and videos.

K12 Inc. provides participating school districts – both with the traditional K12 Inc. program as well as the customizable Fuel Education option – with the full curriculum, online learning platform, and technical support.

Omaha Virtual School

As noted above, Omaha Public Schools uses K12 Inc. to offer the state of Nebraska's first virtual school, which opened in Fall 2016. This K-8 school uses blending learning, and combines online instruction with face-to-face experiences such as labs, field trips, and guest speakers.[53] The school was initially open to home-school students only, and uses the parent

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48 "Tuition-Free Online & Virtual Public Schools," Op. cit.
49 Ibid.
50 "Products and Services." Fuel Education. http://www.getfueled.com/products-services
51 Ibid.
52 Bullet points taken verbatim from: "How It Works." Peak Education. http://www.getfueled.com/peak/#overview
53 "Home." Omaha Virtual School. http://www.omahavirtualschool.org/

representative or learning coach model referenced above to ensure student progress and success.[54] Specifically, the district offers opportunities for parents to participate in computer literacy programs so that they are able to support their child's work at home.

Students are placed in courses based on their performance on the NWEA-MAP assessments in math, reading, and science, with the school establishing the goal of student growth by 5 percent on NWEA scores across the school year. Students work through the curriculum at a pace determined by the learning coach in collaboration with the student. The school has five full-time teachers as well as a Student Learning Advocate, who works to meet the needs of the school's students and families.[55]

High school students in the district may take online classes through a blended model, which allows students to complete classes at their own pace while also attending "face-to face instruction or enrichment activities [...] at least once a week."[56]

COST

The K12 Inc. "district-run" school model is intended to be free of charge for students while the school district undertakes the full cost of the program. An article in the *Omaha World Herald* noted that Nebraska is one of only seven states that does not provide state funding for online learning.[57] The cost of the Omaha Virtual School is borne by the district general budget; similar district virtual school programs do not divulge the cost burden for a school district.[58] Individual online courses generally cost $249.00 for a 12-month unlimited license.[59]

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[54] "Frequently Asked Questions." Omaha Virtual School. http://www.omahavirtualschool.org/faq.html

[55] "Meet the Staff." Omaha Virtual Schools. http://www.omahavirtualschool.org/meet-the-staff.html

[56] Duffy, E. "OPS to Test Virtual Education Program with Home-Schooled Students in Grades K-8." *Omaha World-Herald*, July 4, 2016. http://www.omaha.com/news/education/ops-to-test-virtual-education-program-with-home-schooled-students/article_0ee8087b-a7ab-5fb7-a7e1-0c8037ddd2a3.html

[57] Ibid.

[58] "Tuition-Free Online & Virtual Public Schools," Op. cit.

[59] "K12 Courses." K12 Inc. https://www.k12courses.com/

ODESSEYWARE

Odysseyware is a web-based multi-media online curriculum which can be used as a standalone curriculum or a supplemental tool in the classroom. It offers core subjects as well as a number of electives, placement testing, diagnostics, and professional development. The online learning system is designed for students in Grades 3-12, either for credit recovery, to assist teachers in "flipping" their classes, for home-schooled students, or to supplement the existing curriculum.[60] Odysseyware also promotes itself as a comprehensive school solution for Common Core, Response to Intervention, support for special education, and English Language Learners.[61]

The Odysseyware program seeks to engage virtual students using multiple techniques and tools geared to a number of learning styles. Such tools include direct instruction videos, learning activities, and games. Some of the specific student curricular tools provided are:[62]

- **Direct Instruction Videos**: assist students in the conceptual understanding of key and procedural skills, impart background knowledge, put concepts into the real-world context, and allow students to learn at their own pace;

- **Guided and Close Reading Modeling**: instill close and guided reading best practices and assist learners in identifying issues such as sound and rhythm, imagery and figurative language, voice, the way characters are portrayed, the importance of setting, and plot structure;

- **"Writer"**: a tool to improve student writing by offering targeted feedback at key factors in the writing process. This feedback encourages student practice and revision to achieve writing success. A "Writer Scoring Matrix" provides continuous feedback as learners process through all aspects of the writing process based on word count, grade level, readability, and topic agreement;

- **Virtual Laboratories**: Math and science Virtual Laboratories recreate and expand the traditional student laboratory experience (for example, a frog dissection). Fully interactive and built to encourage active learning, engagement, and the application of conceptual understanding;

- **Dynamic Learning Activities**: embedded learning activities and games provide learners with the opportunity to test and apply lesson concepts and knowledge prior to formal assessment; and

- **Assessment**: embedded formative and summative assessments test student progress toward content mastery and help inform instruction. In Odysseyware's Flex and CRx (Credit Recovery) modes, custom and prescriptive student learning paths are created based on student proficiency and content mastery needs.

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[60] "Odysseyware: Online Learning System with Virtual Science Labs." The Ed Tech Round Up, October 3, 2014. http://www.edtechroundup.org/reviews/odysseyware-online-learning-system-with-virtual-science-labs

[61] "School Solutions." Odysseyware. https://www.odysseyware.com/school-solutions

[62] Bullet points taken verbatim with minor edits from: "Student Engagement Leads to Academic Success." Odysseyware. https://www.odysseyware.com/student-engagement

Odysseyware resource materials include a number of customized and blended learning solutions among its four discrete learning models. Districts can choose the model and how to structure student schedules, including the amount of time spent in virtual learning versus learning at a brick-and-mortar campus. These four models are highlighted in Figure 2.2.

Figure 2.2: Odysseyware Blended Learning Models

MODEL	DESCRIPTION
Rotation Model	Students rotate on a fixed schedule or at the teacher's discretion between learning modalities, at least one of which is online learning: Lab Rotation, Station Rotation, Flipped Classroom, and Individual Rotation.
Flex Model	A program in which content and instruction are delivered primarily by the internet; students move on an individually customized, fluid schedule among learning modalities, and the teacher-of-record is on-site.
Enriched Virtual Model	A whole-school experience, in which students divide their time between attending a brick-and-mortar campus and learning remotely, using online delivery of content and instruction within each course.
Self-Blend Model	Students self-blend some individual online courses and take other courses at a brick-and-mortar campus with face-to-face teachers.

Source: Odysseyware[63]

The models highlighted above allow districts to potentially test out a virtual school curriculum before committing fully to an all-online program. In addition to multiple learning models, students using the program can test out of course lessons based on their understanding of the topics covered in the curriculum. This Odysseyware feature is called "Credit Recovery Mode," and provides students a "learning path based on assessed content mastery." [64] Whether a student may skip a unit is determined by a pretest prior to beginning the unit.

Teachers can adjust all lessons or units to align with state, district, or school sequences, as well as adjust course levels for each student.[65] The interface includes a number of other customizable elements, including:[66]

- **Teacher Dashboard**: displays the current school calendar and required teacher actions, such as assignments in need of grading, addressing new student messages, and supporting requests initiated through the student Help button;

- **Assignment Alerts Tab**: displays all student assignments with a status of "completed," "graded," "assigned," or "overdue;"

- **Reports**: allows teachers to have the option to run a number of reports to monitor student progress and inform instruction; and

- **Course search and enrollment features**: intuitive course-search feature allows teachers to enroll individual students or classes.

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[63] Chart contents taken verbatim from: "Odysseyware: In Partnership with Big Sky Discovery Academy." Odysseyware. p. 9. http://bigskydiscoveryacademy.org/wp-content/uploads/2015/08/BSDA_OW_Overview.pdf
[64] Ibid., p. 11.
[65] "Course Customization." Odysseyware. https://www.odysseyware.com/teacher-experience
[66] Bullet points taken verbatim with minor edits from: "Admin & Teacher Interface." Odysseyware. https://www.odysseyware.com/teacher-interface

DISTRICT PARTNERSHIPS

As one of the larger organizations in the virtual learning market, Odysseyware works with dozens of K-12 districts nationwide. Several districts use the tool as part of their virtual learning solutions, although it appears that districts oftentimes use Odysseyware as one program within a larger system of providers.

For example, a 2011 report from the Christensen Institute examined the providers and vendors used by 40 districts to provide blended learning. The report noted that the use of large vendors or online content providers is highly fragmented, and that schools often need to use more than one content provider to support their program.[67] For example, School of One in New York City reports that it uses more than 50 content providers, including Odysseyware, as well as Florida Virtual School, Michigan Virtual School, Compass Learning, and Pearson.[68] The report also notes that one district that selected the Odysseyware platform to provide curriculum and learning management could not integrate it with its existing student information system, resulting in administrators having to upload information manually between multiple systems.[69]

Similarly, in a 2011 report by Independence Institute on virtual learning in Colorado, one district identified as using Odysseyware also uses a combination of other providers. Karval School District RE-23 operates "Karval Online Education," which is run by the district and uses a combination of courses from a variety of vendors, including Odysseyware, A+, Discover Intensive Phonics, and CustomGuide.[70]

COSTS

The Odysseyware curriculum is sold through regional education specialists, making it difficult to identify a current cost estimate for the platform, particularly as it offers a number of turnkey and individual a la carte virtual learning solutions.[71]

According to a 2012 news article regarding the potential purchase of Odysseyware by a Connecticut high school, one Odysseyware license (which may be used by one student) was $700.00.[72] The article notes that Odysseyware representatives claim that some districts can potentially reduce the cost of partnering with a provider like Odysseyware by using state funding for students who drop out and then come back into a district.[73]

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[67] "Madeira City Schools Planning Commission: Blended Learning." Madeira City Schools, March 13, 2014. p. 119. http://www.madeiracityschools.org/docs/BlendedLearningReport%201.pdf

[68] Ibid.

[69] Ibid., p. 109.

[70] Peterson, E. and Benigno, P. "Choosing a Colorado Online School for Your Child." Independence Institute, November 2011. p. 11. https://www.i2i.org/wp-content/uploads/2011/12/IP-9-2011_a.pdf

[71] "Alabama Districts Choosing Odysseyware to Meet State Mandated Online Course Mandate." Odysseyware, September 23, 2015. https://www.odysseyware.com/press-release/alabama-districts-choosing-odysseyware-meet-state-mandated-online-course-mandate

[72] Satija, N. "School Districts Paying Big Money for Online Programs." The CT Mirror, May 18, 2012. http://ctmirror.org/2012/05/18/school-districts-paying-big-money-online-programs/

[73] Ibid.

Similarly, Clay Central-Everly High Schools in Iowa began using Odsseyware in 2011. An article in the local newspaper indicates that the initial district cost was $5,000 for the first year of fixed credits. This included seven to 10 units per class, at $20 per unit, for a final estimated cost of $140-$200 per class. The article notes that unused credit could be rolled over to the following year, or "if credit is used quicker than anticipated, the district can switch to a $5,500 option that allows up to 40 students to use the system each day."[74]

APEX LEARNING

Apex Learning, headquartered in Seattle, provides standards-based digital curricula aimed at engaging Grade 6-12 students in virtual learning, using supports and scaffolds to guide them through a variety of programs.[75] The company claims to be the "leading provider of blended and virtual learning solutions to the nation's schools." [76] According to EdSurge, an independent information resource for education technology, more than one million students are using Apex Learning's signature product, "Comprehensive Courses," which are digital courses designed for high school students.[77]

According to EdSurge, students may login to their account and watch interactive instructional videos, animations, and tutorials, and follow prompts to complete corresponding interactive questions in multiple choice, free response, fill in, or gamified format."[78] Follow-up questions and writing prompts focus on observation, inquiry, creativity, and confirmation.

Courses are used in school districts primarily for initial credit and credit recovery. Figure 2.3 below highlights the four main digital learning tools offered by Apex Learning, including Comprehensive Courses, Tutorials, Virtual School, and Success Management.

Figure 2.3: Apex Learning Digital Learning Offerings

CURRICULAR ELEMENT	DESCRIPTION
Comprehensive Courses[79]	Complete courses of study to meet high school graduation requirements, including three major pathways: ■ **Foundations**: Skill-based courses to prepare students for success in high school coursework ■ **Core**: Grade-level courses with step-by-step scaffolding for struggling learners and readers ■ **AP and Honors**: College and grade-level courses for students ready to extend their learning.

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[74] Licht, G. "Odysseyware Approved by CC-E Board." *The Daily Reporter*, August 18, 2011. http://www.spencerdailyreporter.com/story/1754218.html

[75] "Effective Digital Curriculum." Apex Learning. https://www.apexlearning.com/

[76] "Leaders of School Districts Using Apex Learning Digital Curriculum Recognized." Apex Learning, March 24, 2015. p. 1. http://dierulunbbeq7.cloudfront.net/documents/Press-Release-03-24-15-Leaders-to-Learn-From.pdf

[77] "Apex Learning Comprehensive Courses." EdSurge. https://www.edsurge.com/product-reviews/apex-learning-comprehensive-courses

[78] Ibid.

[79] "2016 – 2017 Catalog." Apex Learning. https://dierulunbbeq7.cloudfront.net/2016-10/digital_curriculum_catalog_16-17.pdf

CURRICULAR ELEMENT	DESCRIPTION
Tutorials[80]	Adaptive Tutorials allow teachers to personalize learning for every student. Each tutorial targets specific, standards-based learning objectives within a four-part design (Learn it, Try it, Review it, Test it).
Virtual School[81]	Full-time and part-time virtual learning school for home-schooled students or for all students to take select online courses. Apex Learning allows districts to start the virtual school option using online teachers, and phase in district teachers.
Success Management[82]	Online tool enabling educators to plan, implement, and ensure program success. The program offers on-demand training, implementation models and best practice guides, and professional development options.

Source: Apex Learning

DISTRICT EXAMPLES

The company offers a number of case studies of districts that are using its various products or have switched from other virtual learning providers. In all cases, Apex Learning emphasizes that its products provide a "more active pedagogical approach" in allowing students to interact with online content by "observing, inquiring, creating, connecting, and confirming."[83]

In 2016, the Educational Services Commission of New Jersey (ESCNJ) made Apex Learning available for all member districts and teachers in 21 counties.[84] The provider was also selected by the Texas Education Agency (TEA) as the exclusive provider of high school level English for the Texas SUCCESS Program.[85] The Arkansas Department of Education's Digital Learning review approved 38 Apex Learning Courses as recommended learning resources, including courses in English language arts, math, science, social studies, foreign language, and physical education.[86]

Charles County Public Schools in Maryland recently launched a virtual academy for Grades 10-12, providing face-to-face instruction as well as virtual learning. The academy uses Apex Learning software, with 30-40 students enrolled for the pilot 2016-2017 school year. Students are required to attend class in person for at least five consecutive hours between 10:00am and 6:00pm Monday to Thursday. The Apex Learning-based virtual academy offers a number

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[80] "Tutorials: High Expectations for All Students." Apex Learning. https://dierulunbbeq7.cloudfront.net/2016-10/tutorials_16-17.pdf

[81] "Virtual Learning Solutions." Apex Learning. https://www.apexlearning.com/digital-curriculum/virtual-school

[82] "Success Managment." Apex Learning. https://www.apexlearning.com/digital-curriculum/services-and-support

[83] See for example: "District Switches to Apex Learning to Increase Student Achievement." Apex Learning. https://www.apexlearning.com/resources/case-studies/district-switches-apex-learning-increase-student-achievement

[84] "New Jersey Schools and Districts Gain Access to Digital Curricula." Apex Learning. https://www.apexlearning.com/resources/news/201609/new-jersey-schools-and-districts-gain-access-digital-curricula

[85] "Apex Learning Awarded Exclusive Contract to Provide High School English for the Texas SUCCESS Program." Apex Learning. https://dierulunbbeq7.cloudfront.net/documents/Press-Release-05-10-16-Apex-Learning-Awarded-Exclusive-Contract-for-Texas-SUCCESS-Program.pdf

[86] "Arkansas Department of Education Approves Apex Learning Digital Curriculum." Apex Learning. p. 1. https://dierulunbbeq7.cloudfront.net/documents/Press-Release-05-04-16-Arkansas-Department-of-Education-Approves-Apex-Learning-Digital-Curriculum.pdf

of core subjects as well as subjects not typically taught in traditional schools. Courses at the Charles County Virtual Academy include:[87]

- English;

- Earth and space science;

- Biology and Chemistry;

- Algebra and Geometry;

- U.S. and World History;

- Personal financial literacy;

- Foundations of Technology;

- Sociology and Psychology;

- Art appreciation; and

- Health and fitness.

Charles County requires that virtual academy students remain at the school through the academic year, after which they may transfer back to their home brick-and-mortar school. Virtual academy students may not participate in sports or extra-curricular activities at their former home school.[88]

COST

Access to Apex Learning Comprehensive Course digital curriculum is offered via a subscription model for a period of 12 months. Individual subscriptions are reusable as students finish their coursework, enabling schools to use a single subscription multiple times during the school year. Subscription prices vary based on the size and type of organization, and the volume of subscriptions purchased. Therefore, there is no published set standard price available for school districts seeking to integrate Apex Learning for digital curriculum and other services. Districts that have published their agreements with Apex Learning provide several points of comparison for pricing. For example, a price quote published by Woodland School District 404 in Washington state indicated prices offered for general studies and Advanced Placement courses as well as professional development services. This quote is displayed below in Figure 2.4.

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[87] Bullet points taken verbatim from: "Virtual Academy Set to Open at Stethem." *The BayNet*, April 18, 2016.
   http://www.thebaynet.com/articles/0416/virtualacademysettoopenatstethem.html
[88] Ibid.

Figure 2.4: Apex Learning Price Quote for Woodland School District 404

Solution	Unit	Unit Price	Volume Discount	Quantity	Price
ClassTools Achieve: All Apex Learning general studies and AP courses; District Flex	Enrolled student	$200.00	50%	300	$30,000.00
Professional Services: Online, 3-hour session	Session	$600.00	0	2	$1,200.00

Source: Woodland School District 404[89]

Tahoe Truckee Unified School District in California also published its client agreement with Apex Learning in 2011, including the price for its district virtual learning services. The details of the services and associated costs are presented in Figure 2.5.

Figure 2.5: Client Agreement for Apex Learning for Tahoe Truckee Unified Schools

Solution	Unit	Price
District Flex access to all courses for students in Grades 9-12	Maximum of 319 students	$26,600.00
Professional Services for one term	4 days of onsite professional development	$8,000.00
Student Books	Three sets of student general studies materials	$790.00 ($263.50 per set)
Teacher Materials	Two sets of the teacher general studies materials	$267.00 ($133.50 per set)

Source: Tahoe Truckee Unified School District[90]

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[89] "Apex Learning Price Quote." Woodland School District 404. p. 1. http://www.woodlandschools.org/storage/file/970/Proposal_WOODLAND%20SD%20-%20CTA-%20Renewal_2010-2011_2nd.pdf

[90] "Client Agreement for Apex Learning Digital Curriculum Solutions." Tahoe Truckee Unified School District, 2011. pp. 7–8. https://pesb.ttusd.org/attachments/36e5384e-9703-4274-bbd9-656b02ffb9c8.pdf

THE NROC PROJECT

The NROC Project is a non-profit virtual learning "movement" comprised of member institutions representing education leaders, teachers, and students to develop and share online resources. NROC is the cornerstone project of the Monterey Institute for Technology, a non-profit organization founded in 2003. All NROC resources are free, created "for teachers by teachers" for instruction at the high school and college levels.[91] Funding for the initiative is provided by The William and Flora Hewlett Foundation, the Bill & Melinda Gates Foundation, and by NROC member organizations.[92] The project began as the "National Repository of Online Courses" and has since expanded. In its current form, NROC is a community-driven non-profit organization focused on college and career readiness dedicated to four shared beliefs reflected in its acronym:[93]

- **Network**: Educational institutions benefit from working together;
- **Resources**: Educators are empowered by high-quality, multimedia content and applications;
- **Open**: Membership keeps costs low for institutions, and free for individuals;
- **College and Career**: Committed to helping students pursue academic and life success.

Currently, NROC represents more than 6 million students from middle school to college, including many of the largest school districts in the U.S., as well as 20 state departments of education.[94]

NROC promotes itself as offering high-quality resources with the most cost-efficient option in support of college and career readiness. NROC membership confers a number of benefits, such as:[95]

- Unlimited use of all NROC content and tools;
- Teaching resources to support instruction;
- Professional development opportunities;
- Implementation support for local adaptations and installations; and
- Community collaboration.

NROC offers courses delivered through two main application platforms, known as HippoCampus and EdReady. These applications may be adapted by member institutions to "support local initiatives and to enhance online, blended and face-to-face learning environments."[96] EdReady and HippoCampus differ in a number of ways, for example:

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[91] "The NROC Project Overview." NROC. https://vimeo.com/118619316

[92] "About Us." Monterey Institute. http://www.montereyinstitute.org/about/

[93] Bullet points taken verbatim from: "About the NROC Project." NROC. http://thenrocproject.org/#/

[94] "NROC Math - Credit Recovery and College Readiness." NROC PowerPoint Presentation. p. 9.
www.thenrocproject.org/cms/wp-content/.../The-NROC-Project_Presentation-K12.ppt

[95] Bullet points taken verbatim from: "About the NROC Project," Op. cit.

[96] Ibid.

- **EdReady**: intended to help students avoid the time and cost of remedial courses. Personalized online learning allows students to fill in knowledge gaps and accelerate students through developmental education requirements. EdReady is focused on math and designed for high school and college students, as well as adult learners and education leaders.[97]

- **HippoCampus**: serves as a repository of multimedia learning tools from NROC as well as Khan Academy, PhET, and SIATech. Students can access free content curated by NROC in math, English, and social studies. Additionally, teachers can build custom playlists and virtual lesson plans, while schools can obtain a custom version of HippoCampus with standards correlations and tech support with membership.[98]

Membership entitles schools to access both HippoCampus and EdReady for both free (public) and customized virtual learning tools. Courses are generally delivered using the Moodle Learning Management System (LMS).

EdReady is available to any Nebraska school and teacher as a service of the ESU Coordinating Council (ESUCC), an organization created to coordinate the activities of the state's educational service units, at no additional cost. One of ESUCC's overall goals is to "[apply] modern web technologies toward the creation of powerful, user-friendly forms and online tools."[99] To that end, part of its action plan includes adding resources to the state-endorsed learning object repository, including a dedicated Nebraska NROC site for teachers with a curated state-specific HippoCampus online library.[100] Teachers can search among 5,700 videos in 13 academic subjects and generate a personalized playlist for use in the middle school or high school classroom. Additionally, teachers who sign up as users may access free teaching materials from other NROC math, science, and English courses, as well as virtual learning units offered by the Learning Games Lab, Khan Academy, and STEMbite.[101]

SAMPLE COURSE SEQUENCE

NROC provides a sample course sequence for one of the English programs, "Developmental English," which is designed to help prepare students for college entrance. The online program has a curriculum that includes developmental English aspects such as reading comprehension, writing, vocabulary building, and grammar.[102] Each English course includes the components highlighted in Figure 2.6.

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[97] "Get Ready for College and Career!" EdReady Powered by NROC. https://edready.org/home
[98] "About the NROC Project," Op. cit.
[99] "COOP Purchasing - Vision, Commitments, Action Plans." Nebraska ESU Coordinating Council. http://www.esucc.org/NROC
[100] "Nebraska ESU Coordinating Council Page." NROC / HippoCampus. http://www.hippocampus.org/?user=myESUCC
[101] Ibid.
[102] "NROC Developmental English: An Integrated Program." NROC. http://www.thenrocproject.org/cms/wp-content/uploads/NROC_English_Onepager_v3b-31.pdf

Figure 2.6: NROC English Course Components

COMPONENT	DESCRIPTION
Foundations	Text-based lessons present the unit's core concepts; grammar, punctuation, and usage; and replace the need for a separate handbook
Pre-Reading Presentation	A multimedia presentation that models effective pre-reading strategies
Active Reader	Enhances reading skills with self-assessment and supporting pedagogy, including audio narration, vocabulary in context, and grammar lessons
Post-Reading Presentation	A multimedia presentation that models post-reading strategies with comprehension exercises, creating a strong bridge from reading to writing
Pre-Writing Presentation	Introduces the specific writing assignment for the unit and models effective pre-writing strategies
Writing Center	An online writing workspace that supports the steps in the writing process with scaffolding, tips, and reviewing features
My Journal	This innovative feature allows learners to build a portfolio of writing in each unit by capturing all annotations to unit reading selections and all responses to comprehension and writing exercises. Thus, a portfolio of writing is waiting for the learners when they are ready to apply it to a specific assignment in the Writing Center. No one starts with a "blank page"

NROC[103]

NROC offers virtual learning courses in English and mathematics. A full sample mathematics unit, Algebra I - an Open Course, is available on the NROC online library.[104] Several districts that have used the program are profiled on the NROC math website. For example, Bay Port High School in Green Bay, WI began two pilot classes using NROC's Algebra I – an Open Course. Specifically, the district implemented one pilot competency-based accelerated class and one standard class. Both classes were held in a computer lab, allowing students to work at their own pace. Students responded well to how the presentations explained algebraic topics, including step-by-step approaches of how to solve problems. Additionally, teachers who had never taught an asynchronous online course noted the benefit of being able to use the software to track student progress and assess if students had mastered the material. Notably, Bay Port High School sends letters home to parents of students registered for Algebra I recommending that students sign up for the NROC blended course.[105]

COST

NROC online learning tools are free of charge for educators. Personalized learning solutions are only available for NROC members, though membership is at no cost.

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[103] Chart contents taken verbatim from: Ibid.

[104] "Algebra 1—An Open Course (Sample Unit 4)." Monterey Institute.
http://moodle.montereyinstitute.org/course/view.php?id=21

[105] "Algebra 1 – An Open Course: Pilot Profile and Case Study - Bay Port High School, WI." NROC. pp. 2-3.
http://nrocmath.org/cms/wp-content/uploads/2012/02/Bay-Port-case-study-Feb2012-Updated-7-16-13.pdf

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